

# PATENT SPECIFICATION

912,601

DRAWINGS ATTACHED.



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## COMPLETE SPECIFICATION.

### Improvements in or relating to Electrical Apparatus.

We, THE GENERAL ELECTRIC COMPANY LIMITED, of Glen House, Stag Place, Victoria, London, S.W.1, a British Company, and EDWARD WILSON, of The General Electric Company Limited, Electronics Division, Lower Ford Street, Coventry, a British Subject, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to electrical apparatus.

The invention is concerned in particular with electrical apparatus of the kind including a control assembly for an adjustable electrical component included in said apparatus, the control assembly including: a spindle rotatable about its own axis, a disc-like knob which, when the apparatus is assembled, is mounted on the spindle so as to be disposed perpendicularly to the axis of the spindle with a part of the knob remote from the spindle disposed in a recess formed in a structure forming part of the apparatus, the spindle being mounted with its axis in a fixed position with respect to said structure, and locking means operative to lock the knob to the spindle, the arrangement being such that, with the spindle in position and the knob unlocked with respect to the spindle, the knob cannot be detached from the spindle while maintaining the knob perpendicular to the axis of the spindle due to the knob being trapped in said recess.

It is an object of the present invention to provide an electrical apparatus of the kind specified in which the knob may be readily removed from and replaced on the spindle without having to move the spindle from its normal position with respect to said structure.

According to the invention, in an electrical apparatus of the kind specified, said assembly also includes a bush which is mounted on the spindle, the knob being pivotably mounted on the bush, said locking means being operative to lock the bush to the spindle, and the arrangement being such that normally the knob is capable of substantially no pivotal movement with respect to the bush but that, when the bush is unlocked with respect to the spindle, the combination of the bush and the knob may be detached from the spindle by moving the bush along the spindle, the knob pivoting with respect to the bush during such movement of the bush in such a manner that initially that part of the knob disposed in said recess undergoes less movement in a direction parallel to the axis of the spindle than does the bush.

One arrangement in accordance with the invention will now be described by way of example with reference to the accompanying drawings, in which:—

Figure 1 is an elevation, shown partly broken away and partly in section, of part of an electrical apparatus of the kind specified; and

Figure 2 is an underneath plan view, also shown partly broken away and partly in section, of the apparatus shown in Figure 1.

In this arrangement, the apparatus is adapted to detect interference signals in the long and medium wave broadcast bands and incorporates a superheterodyne radio receiver, a signal generator, and means for comparing a signal generated by the signal generator with an interference signal received by the receiver so as to enable the radio frequency voltage and the electric and magnetic field strengths of the interference signal to be determined.

The receiver incorporates a potentiometer

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which, together with other electrical components included in the apparatus, is mounted within a chassis in the form of a rectangular metal box.

5 Referring now to the drawings, the chassis 1 is housed in a cabinet 2 which includes a front panel 3 on which are mounted various controls (not shown) for the apparatus and to which the chassis 1 is secured, an opposite pair of sides of the chassis 1 being disposed parallel to the panel 3; the remaining rear portion 4 of the cabinet 2 is readily detachable from the panel 3, being normally attached thereto by means of a number of screws (not shown).

10 The apparatus includes a control assembly for the potentiometer, this assembly including a spindle 5 one end of which is mounted the movable contact of the potentiometer, the spindle 5 being mounted on the potentiometer and being rotatable about its own axis. The spindle 5 passes through a circular aperture (not seen) formed in one of the sides of the chassis 1 which is disposed at right angles to the panel 3, the spindle 5 projecting a short distance outside the chassis 1, and the axis of the spindle 5 being disposed parallel to the panel 3. The control assembly also includes a disc-like knob 15 6 having flat and parallel main faces which is made of artificial resin and the periphery of which is knurled, the knob 6 being pivotably mounted on a metal bush 7 which fits over that part of the spindle 5 projecting outside the chassis 1. A rectangular aperture 8 is centrally formed in the knob 6, the smaller dimension of the aperture 8 being slightly greater than the outer diameter of the bush 7, and the bush 7 fits partly inside 20 the aperture 8 with its axis perpendicular to a diameter of the knob 6.

25 The knob 6 is formed by two similar parts 9 and 10 which are secured together by rivets 11, the interface between the parts 9 and 10 lying in a plane parallel to the main faces of the knob 6, and the knob 6 is pivotable about a pair of coaxial pins 12 trapped between the parts 9 and 10; each of the pins 12 is housed in a pair of grooves 13 respectively formed in the inner faces of the parts 9 and 10, each pin 12 being located in position with respect to the knob 6 by virtue of a head 14 formed on the pin 12 fitting in a small recess 15 formed in the knob 6. The pins 12 project into the aperture 8 from opposite sides thereof, and the axes of the pins 12 pass through the centre of the knob 6 perpendicularly to the longer edges of the aperture 8. Those parts of the pins 12 which are disposed in the aperture 8 are respectively rotatable fits in a pair of diametrically opposed holes 16 formed in the bush 7, the arrangement being such that, when the bush 7 is disposed with its axis perpendicular to the main faces of the knob 6, one

30 end of the bush 7 is flush with one main face of the knob 6 while the other end of the bush 7 projects a short distance beyond the other main face of the knob 6; also, the longer dimension of the aperture 1 is such that when the combination of the bush 7 and the knob 6 is detached from the rest of the apparatus the knob 6 is freely rotatable about the bush 7.

35 In the assembled apparatus as shown in the drawings, the bush 7 is arranged so that one of the main faces of the knob 6 is disposed adjacent that side of the chassis 1 through which the spindle 5 projects, this main face being flush with one end of the bush 7, and a felt washer 17 is trapped between this face of the knob 6 and the adjacent side of the chassis 1 so that the knob 6 is capable of substantially no pivotal movement with respect to the bush 7 and so that no rotating of the knob 6 is liable to occur. The bush 7 is locked to the spindle 5 in this position by means of a grub screw 18 which is located in a threaded hole 19 formed in the bush 7 and is adapted to engage with a flattened portion 20 of the surface of the spindle 5 so as to locate the bush 7 in a fixed angular position with respect to the spindle 5.

40 A slot 21 is formed in the front panel 3, the slot 21 extending in a direction perpendicular to the axis of the spindle 5. Part of the knob 6 is disposed in the slot 21, part of the periphery of the knob 6 projecting slightly beyond the front face of the panel 3 so that the potentiometer may be adjusted by operating the knob 6 from outside the cabinet 2. The length and width of the slot 21 at the front face of the panel 3 are slightly greater than the corresponding dimensions of the adjacent part of the knob 6, and the slot 21 is chamfered so that the slot 21 tapers inwardly from the rear face of the panel 3 in the manner shown in the drawings.

45 A portion of the chassis 1 is detachable from the remainder of the chassis 1 for the purpose of enabling access to be gained to the components housed in the chassis 1, this portion being normally attached to the remainder of the chassis 1 by a number of screws (not shown). This portion includes the side through which the spindle 5 projects, and thus it will be appreciated that the knob 6 must be removed from the spindle 5 before this portion can be detached from the remainder of the chassis 1.

50 The manner in which the knob 6 is removed from the spindle 5 is as follows. Firstly, the rear portion 4 of the cabinet 2 is detached from the front panel 3 so as to expose the chassis 1. The knob 6 is then rotated so that the long dimension of the aperture 8 is at right-angles to the panel 3, and, after loosening the grub screw 18, the

55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130

combination of the bush 7 and knob 6 is removed from the spindle 5 by sliding the bush 7 along the spindle 5 away from the chassis 1. During this movement of the bush 7 relative to the spindle 5, the aperture 8 permits the knob 6 to pivot with respect to the bush 7 about the pins 12 so that that part of the knob 6 disposed in the slot 21 initially undergoes substantially no movement in a direction parallel to the axis of the spindle 5. The knob 6 continues to pivot until the bush 7 slides off the end of the spindle 5 (the positions of the knob 6 and bush 7 at this stage being as shown in ghost outline in Figure 1 of the drawings); it will be appreciated that such pivotal movement of the knob 6 is permitted by virtue of the fact that that long bounding side of the slot 21 nearer the face of the cabinet 2 is chamfered. In order to replace the knob 6 on the spindle 5, the procedure described above for removing the knob 6 from the spindle 5 is reversed.

It will be appreciated that, if the knob 6 were rigidly attached to the bush 7, it would be necessary to detach the chassis 1 from the panel 3 before the knob 6 could be removed from the spindle 5, since otherwise it would not be possible to slide the bush 7 along the spindle 5 due to the fact that the knob 6 would be trapped in the slot 21.

10 15 20 25 30 35

knob is capable of substantially no pivotal movement with respect to the bush that, when the bush is unlocked with respect to the spindle, the combination of the bush and the knob may be detached from the spindle by moving the bush along the spindle, the knob pivoting with respect to the bush during such movement of the bush in such a manner that initially that part of the knob disposed in said recess undergoes less movement in a direction parallel to the axis of the spindle than does the bush.

2. An electrical apparatus according to Claim 1, in which at least one bounding side of the recess is chamfered in such a manner as to permit pivotal movement of the knob while part of the knob remains in said recess.

3. An electrical apparatus according to either Claim 1 or Claim 2, in which said adjustable electrical component, the spindle and the major part of the knob are mounted inside a cabinet part of which constitutes said structure, and in which said recess is in the form of an aperture in the wall of the cabinet, part of the knob extending through the aperture so that the knob can be operated from outside the cabinet.

4. An electrical apparatus according to Claim 3, in which said aperture is in the form of an elongated slot, and in which the knob is pivotable about an axis extending parallel to the length of the slot.

5. An electrical apparatus of the kind specified substantially as hereinbefore described with reference to the accompanying drawings.

40 45 50 55 60 65 70 75

WHAT WE CLAIM IS:—  
 1. An electrical apparatus of the kind specified, in which said assembly also includes a bush which is mounted on the spindle, the knob being pivotably mounted on the bush, said locking means being operative to lock the bush to the spindle, and the arrangement being such that normally the

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COMPLETE SPECIFICATION  
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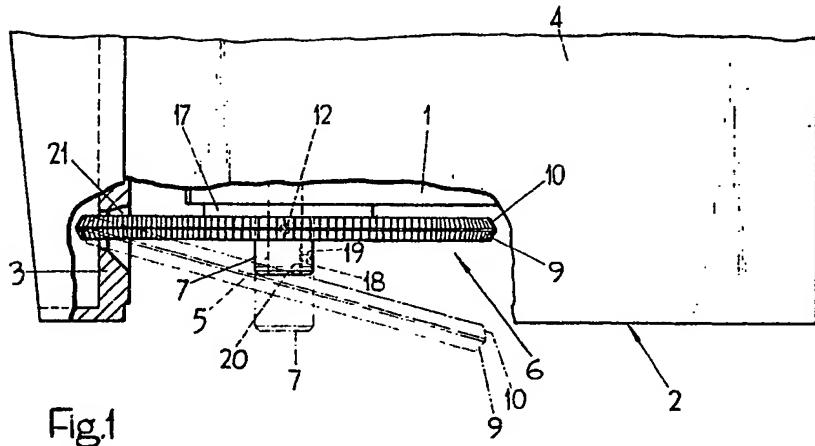


Fig. 1

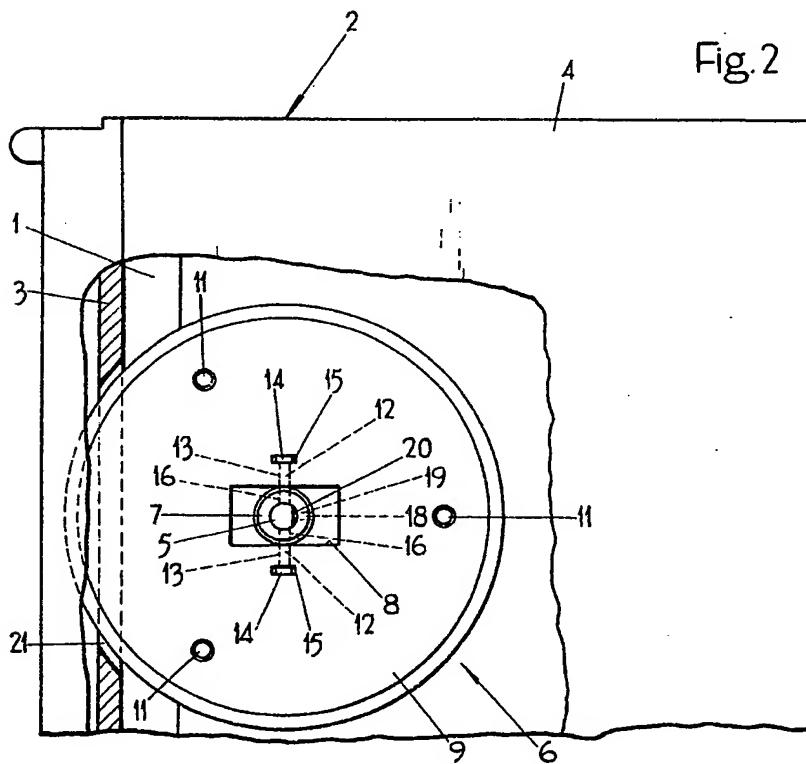


Fig. 2